

In the Claims:

1. (Currently amended) A synthetic mammalian expression plasmid for plasmid mediated gene supplementation in a species comprising:

- (a) a synthetic or eukaryotic promoter comprising SEQ ID NO: 15;
- (b) a codon-optimized-eukaryotic therapeutic gene sequence having at least one codon modification specific to the species;
- (c) a ~~poly-adenelation~~ polyadenylation signal;
- (d) a selectable marker gene ~~promoter~~ sequence;
- (e) a ribosomal binding site;
- (f) a promoter for the selectable marker gene sequence; and
- (g) an origin of replication;

wherein the synthetic or eukaryotic promoter, the codon-optimized-eukaryotic therapeutic gene sequence, and the ~~poly-adenylation~~ polyadenylation signal comprise therapeutic elements of the synthetic mammalian expression plasmid; the therapeutic elements are operatively linked and located in a first operatively-linked arrangement; the selectable marker gene promoter, the ribosomal binding site, the selectable marker gene sequence, and the origin of replication comprise replication elements of the synthetic mammalian expression plasmid; the replication elements are operatively linked and located in a second operatively-linked arrangement; the first-operatively-linked arrangement and the second-operatively-linked arrangement comprise a circular structure of the synthetic mammalian expression plasmid; and the synthetic mammalian expression plasmid is utilized for plasmid mediated gene supplementation in the species.

2. (Original) The synthetic mammalian expression plasmid of claim 1, wherein the origin of replication comprises a prokaryotic origin of replication sequence.

3. (Original) The synthetic mammalian expression plasmid of claim 1, wherein the origin of replication comprises an autonomously replication sequence ("ARS").

4. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the origin of replication comprises ~~SeqID#12~~ SEQ ID NO: 12.

5. (Original) The synthetic mammalian expression plasmid of claim 1, wherein the ribosomal binding site ("RBS") comprises a prokaryotic RBS.

6. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the ribosomal binding site ("RBS") comprises ~~SeqID#13~~ SEQ ID NO: 13.
7. (Original) The synthetic mammalian expression plasmid of claim 1, wherein the poly-adenylation signal ("PolyA") comprises a eukaryotic poly A signal.
8. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the poly-adenylation signal ("PolyA") comprises ~~SeqID#10~~ SEQ ID NO: 10.
9. (Original) The synthetic mammalian expression plasmid of claim 1, wherein the 5' UTR comprises a portion of a eukaryotic 5' UTR.
10. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the 5' UTR comprises ~~SeqID#11~~ SEQ ID NO: 11.
11. (Original) The synthetic mammalian expression plasmid of claim 1, further comprising a prokaryotic promoter.
12. (Original) The synthetic mammalian expression plasmid of claim 11, wherein the prokaryotic promoter comprises PNEO and a transposon fragment ("Tn5").
13. (Currently amended) The synthetic mammalian expression plasmid of claim 11, wherein the prokaryotic promoter comprises ~~SeqID#14~~ SEQ ID NO: 14.
14. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the selectable marker gene comprises ~~SeqID#3~~ SEQ ID NO: 3.
15. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the ~~codon-optimized-mammalian~~ codon-optimized-eukaryotic therapeutic gene sequence comprises at least one species specific codon modification.
16. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the ~~codon-optimized-mammalian~~ codon-optimized-eukaryotic therapeutic gene sequence comprises a signal peptide.
17. (Original) The synthetic mammalian expression plasmid of claim 16, wherein the signal peptide is species specific.
18. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the ~~codon-optimized-mammalian~~ codon-optimized-eukaryotic therapeutic gene sequence

comprises a sequence that encodes a modified species specific growth hormone releasing hormone (“GHRH”).

19. (Currently amended) The synthetic mammalian expression plasmid of claim 1, further comprising a 5’ untranslated region (“UTR”) operatively linked to the first operatively-linked arrangement.

20. (Original) The synthetic mammalian expression plasmid of claim 19, wherein the 5’ untranslated region (“UTR”) comprises a portion of a human growth hormone 5’UTR.

21. (Withdrawn – currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the codon optimized mammalian therapeutic gene sequence comprises ~~SeqID#4~~ SEQ ID NO: 4.

22. (Withdrawn – currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the codon optimized mammalian therapeutic gene sequence comprises ~~SeqID#5~~ SEQ ID NO: 5.

23. (Withdrawn – currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the codon optimized mammalian therapeutic gene sequence comprises ~~SeqID#6~~ SEQ ID NO: 6.

24. (Currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the ~~codon optimized mammalian~~ codon-optimized-eukaryotic therapeutic gene sequence comprises ~~SeqID#7~~ SEQ ID NO: 7.

25. (Withdrawn – currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the codon optimized mammalian therapeutic gene sequence comprises ~~SeqID#8~~ SEQ ID NO: 8.

26. (Withdrawn – currently amended) The synthetic mammalian expression plasmid of claim 1, wherein the codon optimized mammalian therapeutic gene sequence comprises ~~SeqID#9~~ SEQ ID NO: 9.

27. (Withdrawn – currently amended) A synthetic mammalian expression plasmid comprising ~~SEQID#17~~ SEQ ID NO: 17.

28. (Withdrawn – currently amended) A synthetic mammalian expression plasmid comprising ~~SEQID#18~~ SEQ ID NO: 18.

29. (Currently amended) A synthetic mammalian expression plasmid comprising ~~SEQID#19~~ SEQ ID NO: 19.

30. (Withdrawn – currently amended) A synthetic mammalian expression plasmid comprising ~~SEQID#20~~ SEQ ID NO: 20.

31. (Withdrawn – currently amended) A synthetic mammalian expression plasmid comprising ~~SEQID#21~~ SEQ ID NO: 21.

Claims 32 – 37. Cancelled.